AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (cancelled)

2. (currently amended) The system as defined in claim [[1]] 47 wherein the vessel is a pressure swing adsorber.

3. (original) The system as defined in claim 2 wherein the pressure swing adsorber comprises multiple, staged fixed beds.

4. (original) The system as defined in claim 2 wherein the pressure swing adsorber is a rotating vessel.

5. (original) The system as defined in claim 4 wherein the rotating vessel comprises:

an adsorption region;

a depressurization region;

a purge region; and

a pressurization region.

6. (original) The system as defined in claim 4 wherein the rotating vessel comprises two fixed valve faces.

7. (currently amended) The system as defined in claim [[1]] 46 which is a fuel cell system.

8. (currently amended) The system as defined in claim [[1]] 47 wherein at least one of the first and second adsorbent is selected from the group consisting of 5A zeolite, 13X zeolite, and mixtures thereof.

9. (currently amended) The system as defined in claim [[1]] 47 wherein at least one of the first and second adsorbent is selected from the group consisting of: oxides or salts of copper impregnated or exchanged on activated carbon, alumina, and zeolites; oxides or salts of silver impregnated or exchanged on activated carbon, alumina, and zeolites; oxides or salts of tin impregnated or exchanged on activated carbon, alumina, and zeolites; and mixtures thereof.

10. (currently amended) The system as defined in claim [[9]] 47 wherein, upstream of the second carbon monoxide adsorbent, the vessel comprises a layer of a desiccant material.

11. (original) The system as defined in claim 10 wherein the desiccant material is selected from the group consisting of zeolite molecular sieves, activated alumina, silica gels, and mixtures thereof.

12-13. (cancelled)

14. (currently amended) The system of claim [[12]] 46 wherein the water gas shift reactor is a high temperature water gas shift reactor.

15. (currently amended) The system as defined in claim [[12]] 46 wherein the ~~second~~ first adsorbent is adapted to adsorb carbon monoxide at low temperatures and is adapted to desorb carbon monoxide at high temperatures.

16. (currently amended) The system as defined in claim [[1]] 47 which further comprises an expander downstream of the vessel, and wherein the expander provides a purge gas to be fed back into the vessel.

17. (original) The system as defined in claim 16 which further comprises a fuel cell stack having an anode exhaust, the fuel cell stack disposed between the vessel and the expander, and wherein the expander expands the anode exhaust, the expanded anode exhaust providing the purge gas to be fed back into the vessel.

18. (original) The system as defined in claim 16 wherein the vessel is a rotating vessel, and wherein the expander is an isothermal expander adapted to provide electrical power for driving the rotating vessel.

19. (withdrawn)

20. (original) A system which comprises a first reactor which produces a hydrogen-rich gas stream containing CO, and an apparatus for removing the carbon monoxide (CO) from the hydrogen-rich gas stream, the apparatus comprising:

a rotating vessel housing a first adsorbent adapted to adsorb the carbon monoxide, wherein the rotating vessel is a pressure swing adsorber and comprises two fixed valve faces, and wherein the rotating vessel further comprises:

an adsorption region;

a depressurization region;

a purge region; and

a pressurization region; and

a second reactor which is a water gas shift reactor disposed between the first reactor and the vessel, wherein the water gas shift reactor includes a second adsorbent adapted to adsorb carbon monoxide, wherein the second adsorbent is adapted to adsorb carbon monoxide at low temperatures and is adapted to desorb carbon monoxide at high temperatures.

21. (original) The system as defined in claim 20 wherein the system further comprises an expander downstream of the vessel, and wherein the expander provides a purge gas to be fed back into the vessel.

22. (original) The system as defined in claim 21 wherein the system is a hydrogen fuel cell system further comprising a fuel cell stack having an anode exhaust, the fuel cell stack disposed between the vessel and the expander, and wherein the expander expands the anode exhaust, the expanded anode exhaust providing the purge gas to be fed back into the vessel.

23. (original) The system as defined in claim 21 wherein the expander is an isothermal expander adapted to provide electrical power for driving the rotating vessel.

24. The system as defined in claim 20 wherein the system includes a low pressure steam stream, and wherein the steam stream provides a purge gas to be fed into the vessel.

25. (original) The system as defined in claim 20 wherein the first adsorbent is further adapted to adsorb at least one of carbon dioxide and water from the hydrogen-rich gas stream.

26. (original) The system as defined in claim 25 wherein the first adsorbent is selected from the group consisting of 5A zeolite, 13X zeolite, and mixtures thereof.

27. (original) The system as defined in claim 20 wherein the adsorbent is selected from the group consisting of oxides or salts of copper impregnated or exchanged on activated carbon, alumina, and zeolites; oxides or salts of silver impregnated or exchanged on activated carbon, alumina, and zeolites; oxides or salts of tin impregnated or exchanged on activated carbon, alumina, and zeolites; and mixtures thereof.

28. (original) The system as defined in claim 27 wherein, upstream of the first carbon monoxide adsorbent, the vessel comprises a layer of a desiccant material selected from the group consisting of zeolite molecular sieves, activated alumina, silica gels, and mixtures thereof.

29. (original) The system as defined in claim 7 wherein a preferential oxidizer (PROX) is eliminated from the hydrogen fuel cell system.

30. (original) The system as defined in claim 22 wherein a preferential oxidizer (PROX) is eliminated from the hydrogen fuel cell system.

31-45. (withdrawn)

46. (new) A system which comprises:

a first reactor which produces a hydrogen-containing gas stream containing carbon monoxide; and

a second reactor, which is a water-gas shift reactor disposed downstream of said first reactor, said water-gas shift reactor having an adsorbent that is a first adsorbent adapted to adsorb the carbon monoxide.

47. (new) The system of claim 46 comprising a vessel downstream of said water-gas shift reactor, said vessel housing a second adsorbent adapted to adsorb the carbon monoxide.